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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/098,617	03/18/2002	Masayuki Sakakura	12732-094001 / US5593/561	3682

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EXAMINER	
KEANEY, ELIZABETH MARIE	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/098,617	SAKAKURA ET AL.	
	Examiner	Art Unit	
	Elizabeth Keaney	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-88* is/are pending in the application.

4a) Of the above claim(s) *53-88* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/22/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Amendments and Remarks filed 20 July 2004 have been entered.

Response to Arguments

Applicant's arguments, filed 20 July 2004, with respect to the rejection(s)of claim(s) 2-34 under 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Yamazaki et al (US Patent 6,583,471; hereinafter Yamazaki).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-13,35-40 and 47-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urabe et al. (US Patent 6,614,174; hereinafter Urabe) in view of Yamazaki (US Patent 6,583,471).

Re claim 2: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a first electrode (M) formed on an insulating surface (1);

- a first insulating layer (50) covering an end portion of the first electrode (M) and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15);
- a second electrode (K) formed on the organic compound layer (10).

Urabe further discloses the second insulating layer (15) comprised of silicon oxide having a thickness of 200nm. However, Urabe fails to teach or fairly suggest the second insulating layer comprising silicon oxide having a thickness of 1-10nm, thereby producing a tunnel junction between the first electrode and the organic compound.

Yamazaki discloses an insulating layer comprised of silicon oxide having a thickness of 5-10nm in order to produce a tunneling current which flows though the insulating layer (column 24, lines 11-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the insulating layer of Yamazaki within the device disclosed by Urabe because it more effectively erases the current image displayed by the device to make way for the subsequent image, thereby reducing any burn in of the image which reduces the clarity of the device overtime.

Re claim 3: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a first electrode (M) formed on an insulating surface (1);
- a first insulating layer (50) covering an end portion of the first electrode (M) and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15);
- a second electrode (K) formed on the organic compound layer (10).

Urabe fails to teach or fairly suggest a second insulating layer having a thickness that allows the first electrode and the organic compound layer to form a tunnel junction.

Yamazaki discloses an insulating layer that has a thickness to provide a tunnel current to flow through the insulating layer (column 24, lines 11-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the insulating layer of Yamazaki within the device disclosed by Urabe because it more effectively erases the current image displayed by the device to make way for the subsequent image, thereby reducing any burn in of the image which reduces the clarity of the device overtime.

Re claim 4: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a first electrode (M) formed on an insulating surface (1);
- a first insulating layer (50) covering an end portion of the first electrode (M) and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15);

a second electrode (K) formed on the organic compound layer (10).

However, Urabe fails to teach or fairly suggest the second insulating layer having a thickness that allows a tunnel current or a Fowler-Nordheim current to flow therethrough.

Yamazaki discloses an insulating layer having a thickness that allows a tunnel current or a Fowler-Nordheim current to flow therethrough (column 24, lines 11-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the insulating layer of Yamazaki within the device disclosed by Urabe because it more effectively erases the current image displayed by the device to make way for the subsequent image, thereby reducing any burn in of the image which reduces the clarity of the device overtime.

Re claim 5: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a thin film transistor (column 5, line 17) comprising a source region (S) and a drain region (D);
- an interlayer insulating film (33) over the source and drain region;
- a drain electrode (D) connected to the drain region through an opening (CON) formed in the interlayer insulating film (33);
- a first electrode (M) formed on the interlayer insulating film (33) so as to be connected to the drain electrode (D);
- a first insulating layer (50) comprising an opening on the first electrode (M), covering an end portion of the first electrode (M), and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15); and
- a second electrode (K) formed on the organic compound layer (10).

However, Urabe fails to teach or fairly suggest the first electrode and the organic compound layer being connected to each other through a tunnel junction.

Yamazaki discloses an insulating layer made of a material and having a thickness that allows a tunnel current flow through the insulating layer (column 24, lines 11-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the insulating layer of Yamazaki within the device disclosed by Urabe because it more effectively erases the current image displayed by the device to make way for the subsequent image, thereby reducing any burn in of the image which reduces the clarity of the device overtime.

Re claim 6: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a thin film transistor (column 5, line 17) comprising a source region (S) and a drain region (D);
- an interlayer insulating film (33) over the source and drain region;
- a drain electrode (D) connected to the drain region through an opening (CON) formed in the interlayer insulating film (33);
- a first electrode (M) formed on the interlayer insulating film (33) so as to be connected to the drain electrode (D);
- a first insulating layer (50) comprising an opening on the first electrode (M), covering an end portion of the first electrode (M), and comprising a tapered edge;

- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15); and
- a second electrode (K) formed on the organic compound layer (10).

However, Urabe fails to teach or fairly suggest the second insulating layer having at thickness that allows the first electrode and the organic compound layer to form a tunnel junction.

Yamazaki discloses an insulating layer having a thickness that allows a tunnel junction to flow through the layer (column 24, lines 11-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the insulating layer of Yamazaki within the device disclosed by Urabe because it more effectively erases the current image displayed by the device to make way for the subsequent image, thereby reducing any burn in of the image which reduces the clarity of the device overtime.

Re claim 7: Urabe discloses, in figure 1 and throughout the disclosure, a light emitting device comprising:

- a thin film transistor (column 5, line 17) comprising a source region (S) and a drain region (D);
- an interlayer insulating film (33) over the source and drain region;

- a drain electrode (D) connected to the drain region through an opening (CON) formed in the interlayer insulating film (33);
- a first electrode (M) formed on the interlayer insulating film (33) so as to be connected to the drain electrode (D);
- a first insulating layer (50) comprising an opening on the first electrode (M), covering an end portion of the first electrode (M), and comprising a tapered edge;
- a second insulating layer (15) formed on the first electrode (M) and the first insulating layer (50);
- an organic compound layer (10) formed on the second insulating layer (15); and
- a second electrode (K) formed on the organic compound layer (10).

However, Urabe fails to teach or fairly suggest the second insulating layer having a thickness that allows a tunnel current or a Fowler-Nordheim current to flow therethrough.

Yamazaki discloses an insulating layer having a thickness that allows a tunnel current or a Fowler-Nordheim current to flow therethrough (column 24, lines 11-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the insulating layer of Yamazaki within the device disclosed by Urabe because it more effectively erases the current image displayed by

the device to make way for the subsequent image, thereby reducing any burn in of the image which reduces the clarity of the device overtime.

Re claims 8-13: Urabe discloses the second insulating layer comprising silicon dioxide (column 7, line 62).

Re claims 35-40: Yamazaki discloses the insulating layer having a thickness of 1-10nm (column 24, line 12).

Re claims 47-52: Urabe discloses the light-emitting device being incorporated in one selected from the group consisting of a computer, a digital camera, a video camera and a mobile phone (column 1, line 13).

Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urabe and Yamazaki as applied to claims 2-7 above, and further in view of Inukai et al. (US Patent 6,680,577; hereinafter Inukai).

Urabe and Yamazaki show all the limitations above, including a second insulation layer.

However, they fail to teach or suggest the insulating layer comprised as carbon.

Inukai discloses the use of carbon as an insulating layer (column 31, line 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a carbon insulating layer for the insulating layer of Urabe and Yamazaki because by using carbon the insulating layer has light transmissive properties as well as heat radiation effects, thereby improving the insulation property of the layer while not impeding the light emitted from the emitters.

Claims 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urabe and Yamazaki as applied to claims 2-4 above, and further in view of Yano et al. (US Patent 6,793,962; hereinafter Yano).

Re claims 20-22: Urabe and Yamazaki show all the limitations as shown above, including an insulating surface comprising glass.

However, Urabe and Yamazaki fail to teach or fairly suggest the insulating surface comprising at least one of silicon nitride and silicon oxynitride.

Yano teaches silicon nitride and glass being functional equivalent materials for an insulating surface (column 8, line 54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute silicon nitride taught by Yano with the glass of Urabe and Yamazaki because the materials are recognized equivalents of one another as shown by Yano. Thus, the selection of silicon nitride over glass is considered to constitute an obvious design variation based on the availability and cost of the materials.

Re claims 23-25: Urabe and Yamazaki show all the limitations as shown above, including the interlayer insulating film comprised of SiO2.

However, they fail to teach or fairly suggest the interlayer insulating film being comprised of at least one of silicon nitride and silicon oxynitride.

Yano teaches silicon nitride and glass being functional equivalent materials for an insulating surface (column 8, line 54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the silicon nitride taught by Yano with the SiO2 of Urabe and Yamazaki because the materials are recognized equivalents of one another as shown by Yano. Thus, the selection of silicon nitride over SiO2 is considered to constitute an obvious design variation based on the availability and cost of the materials.

Claims 26-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urabe and Yamazaki as applied to claims 2-7 above, and further in view of Segawa (US Patent 6,492,778).

Urabe and Yamazaki show all the limitations as shown above, including an interlayer insulating film.

However, they fail to teach or fairly suggest the interlayer insulating film comprising two layers and an insulating layer comprised of polymide and acrylic resin.

Segawa discloses the use of an interlayer insulating film having two layers (colum 4, line 9) wherein the first layer includes silicon nitride (column 4, line 9) and the second layer includes acrylic resin (column 4, line 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a multiple layer insulating film for the interlayer insulating film disclosed by Urabe because the first layer of the insulating film acts as an insulator for the emissive elements and the second layer planarizes the surface of the insulating region located above the emissive elements thereby improving the brightness of the light emitted.

Claims 41-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urabe and Yamazaki as applied to claims 2-7 above, and further in view of Eida et al. (US Patent 6,633,121; hereinafter Eida).

Urabe and Yamazaki show all the limitations above, including the insulating surface comprising glass.

However, they fail to teach or fairly suggest the insulating layer comprising at least one of polyimide resin and acrylic resin.

Eida teaches a polyimide and acrylic resin and glass being functional equivalent materials for an insulating surface (column 11, lines 44-49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the polyimide or acrylic resin taught by Eida for the glass substrate of Urabe and Yamazaki because they are recognized equivalents of one

another as shown by Eida. Thus, the selection of polyimide or acrylic resin over glass is considered to constitute an obvious design variation based on the availability and cost of the materials.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Keaney whose telephone number is (571)272-2489. The examiner can normally be reached on Monday-Thursday 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

emk

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER